

§ 73.160

47 CFR Ch. I (10–1–98 Edition)

seasonal or temporary features in either the written descriptions or photographs as landmarks for locating field points.

(b) When the descriptive routing to reach any of the monitoring points as shown on the station license is no longer correct due to road or building construction or other changes, the licensee must prepare and file with the FCC, in Washington, DC, a request for a corrected station license showing the new routing description. A copy of the description is to be posted with the existing station license. The notification is to include the information specified in paragraphs (a) (2) and (3) of this section.

[47 FR 28387, June 30, 1982]

§ 73.160 Vertical plane radiation characteristics, $f(\theta)$.

(a) The vertical plane radiation characteristics show the relative field being radiated at a given vertical angle, with respect to the horizontal plane. The vertical angle, represented as θ , is 0 degrees in the horizontal plane, and 90 de-

grees when perpendicular to the horizontal plane. The vertical plane radiation characteristic is referred to as $f(\theta)$. The generic formula for $f(\theta)$ is:

$$f(\theta) = E(\theta)/E(O)$$

where:

$E(\theta)$ is the radiation from the tower at angle θ .

$E(O)$ is the radiation from the tower in the horizontal plane.

(b) Listed below are formulas for $f(\theta)$ for several common towers.

(1) For a typical tower, which is not top-loaded or sectionalized, the following formula shall be used:

$$f(\theta) = \frac{\cos(G \sin \theta) - \cos G}{(1 - \cos G) \cos \theta}$$

where:

G is the electrical height of the tower, not including the base insulator and pier. (In the case of a folded unipole tower, the entire radiating structure's electrical height is used.)

(2) For a top-loaded tower, the following formula shall be used:

$$f(\theta) = \frac{\cos B \cos(A \sin \theta) - \sin \theta \sin B \sin(A \sin \theta) - \cos(A + B)}{\cos \theta (\cos B - \cos(A + B))}$$

where:

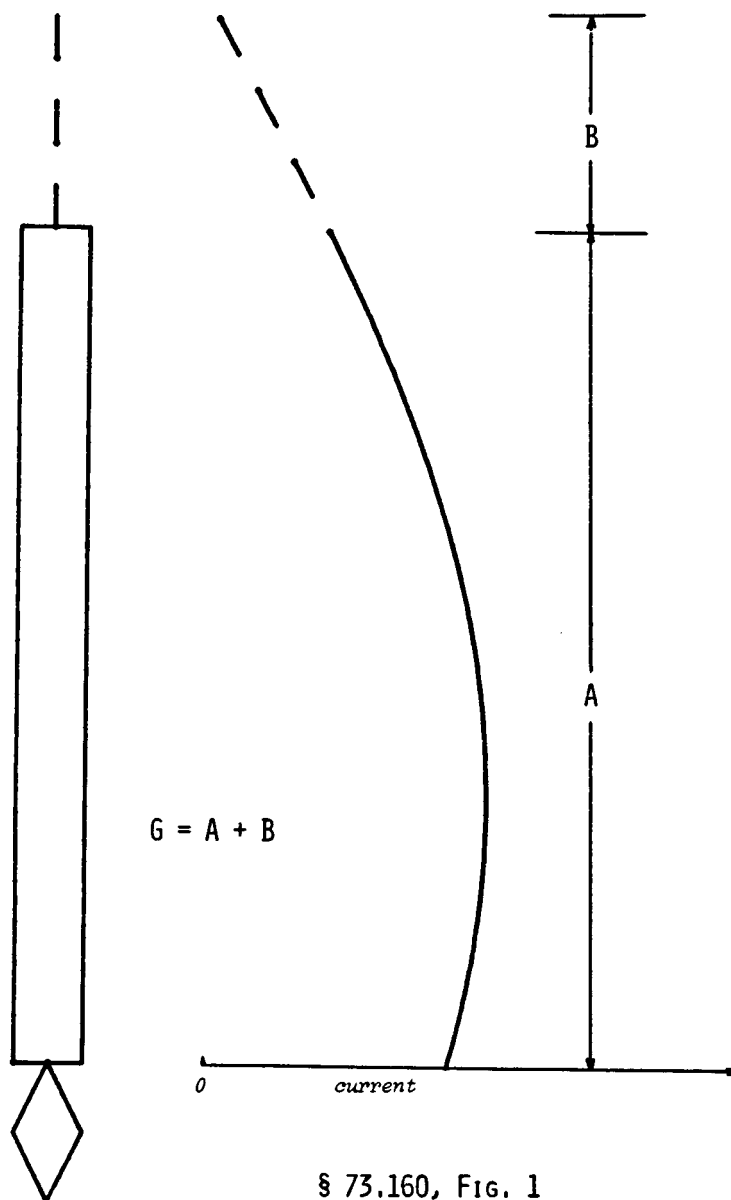
A is the physical height of the tower, in electrical degrees, and

B is the difference, in electrical degrees, between the apparent electrical height

(G , based on current distribution) and the actual physical height.

G is the apparent electrical height: the sum of A and B ; $A+B$.

See Figure 1 of this section.



§ 73.160, FIG. 1

(3) For a sectionalized tower, the following formula shall be used:

$$f(\theta) = \frac{\sin B [\cos D \cos (C \sin \theta) - \sin \theta \sin D \sin (C \sin \theta) - \cos \Delta \cos (A \sin \theta)] + \sin \Delta [\cos B \cos (A \sin \theta) - \cos G]}{\cos \theta [\sin \Delta (\cos B - \cos G) + \sin B (\cos D - \cos \Delta)]}$$

where:

A is the physical height, in electrical degrees, of the lower section of the tower.
 B is the difference between the apparent electrical height (based on current distribution) of the lower section of the tower and the physical height of the lower section of the tower.
 C is the physical height of the entire tower, in electrical degrees.

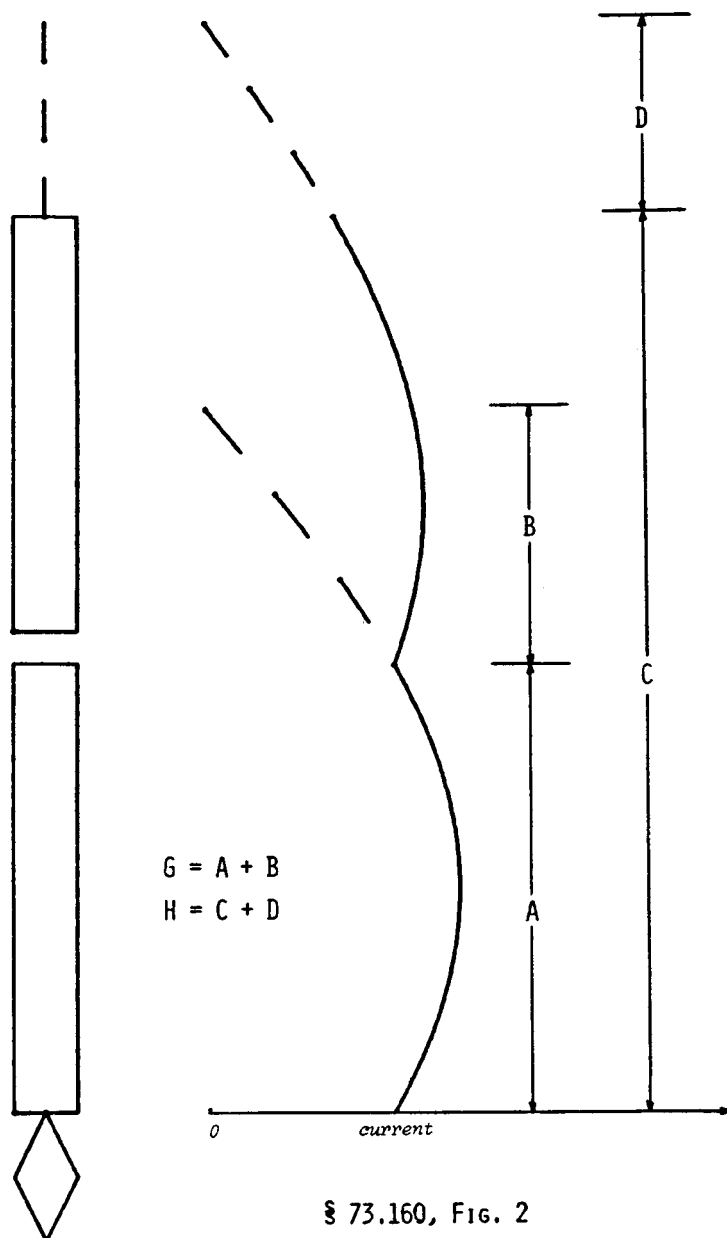
D is the difference between the apparent electrical height of the tower (based on current distribution of the upper section) and the physical height of the entire tower. D will be zero if the sectionalized tower is not top-loaded.

G is the sum of A and B; $A+B$.

H is the sum of C and D; $C+D$.

Δ is the difference between H and A; $H-A$.

See Figure 2 of this section.



§ 73.160, FIG. 2

(c) One of the above $f(\theta)$ formulas *must* be used in computing radiation in the vertical plane, unless the applicant submits a special formula for a particular type of antenna. If a special formula is submitted, it must be accompanied by a complete derivation and sample calculations. Submission of values for $f(\theta)$ only in a tabular or graphical format (i.e., without a formula) is not acceptable.

(d) Following are sample calculations. (The number of significant figures shown here should *not* be interpreted as a limitation on the number of significant figures used in actual calculations.)

(1) For a typical tower, as described in paragraph (b)(1) of this section, assume that $G=120$ electrical degrees:

θ	$f(\theta)$
0	1.0000
30	0.7698
60	0.3458

(2) For a top-loaded tower, as described in paragraph (b)(2) of this section, assume $A=120$ electrical degrees, $B=20$ electrical degrees, and $G=140$ electrical degrees, $(120+20)$:

θ	$f(\theta)$
0	1.0000
30	0.7364
60	0.2960

(3) For a sectionalized tower, as described in paragraph (b)(3) of this section, assume $A=120$ electrical degrees, $B=20$ electrical degrees, $C=220$ electrical degrees, $D=15$ electrical degrees, $G=140$ electrical degrees $(120+20)$, $H=235$ electrical degrees $(220+15)$, and $\Delta=115$ electrical degrees $(235-120)$:

θ	$f(\theta)$
0	1.0000
30	0.5930
60	0.1423

[46 FR 11993, Feb. 12, 1981]

§ 73.182 Engineering standards of allocation.

(a) Sections 73.21 to 73.37, inclusive, govern allocation of facilities in the AM broadcast band 535–1705 kHz. § 73.21 establishes three classes of channels in this band, namely, clear, regional and local. The classes and power of AM broadcast stations which will be as-

signed to the various channels are set forth in § 73.21. The classifications of the AM broadcast stations are as follows:

(1) Class A stations operate on clear channels with powers no less than 10kW nor greater than 50 kW. These stations are designed to render primary and secondary service over an extended area, with their primary services areas protected from objectionable interference from other stations on the same and adjacent channels. Their secondary service areas are protected from objectionable interference from co-channel stations. For purposes of protection, Class A stations may be divided into two groups, those located in any of the contiguous 48 States and those located in Alaska in accordance with § 73.25.

(i) The mainland U.S. Class A stations are those assigned to the channels allocated by § 73.25. The power of these stations shall be 50 kW. The Class A stations in this group are afforded protection as follows:

(A) Daytime. To the 0.1 mV/m groundwave contour from stations on the same channel, and to the 0.5 mV/m groundwave contour from stations on adjacent channels.

(B) Nighttime. To the 0.5 mV/m-50% skywave contour from stations on the same channels.

(ii) Class A stations in Alaska operate on the channels allocated by § 73.25 with a minimum power of 10 kW, a maximum power of 50 kW, and an antenna efficiency of 282 mV/m/kW at 1 kilometer. Stations operating on these channels in Alaska which have not been designated as Class A stations in response to licensee request will continue to be considered as Class B stations. During daytime hours a Class A station in Alaska is protected to the 100 μ V/m groundwave contour from co-channel stations. During nighttime hours, a Class A station in Alaska is protected to the 100 μ V/m-50 percent skywave contour from co-channel stations. The 0.5 mV/m groundwave contour is protected both daytime and nighttime from stations on adjacent channels.